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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR SEPTEMBER 1934

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FRACKER AND GADDIS DESIGNATED TO HEAD DIVISIONS

On October 15 S. B. Fracker became head of the Division of Plant Disease Control and B. M. Gaddis became head of the Division of Domestic Plant Quarantines.

The Division of Plant Disease Control, which is concerned with the control and prevention of spread of white pine blister rust and black stem rust, the latter commonly spoken of as barberry eradication, has been under the direction of Dr. Fracker since the illness of the late Karl F. Kellerman.

Mr. Gaddis, who has been appointed to fill the position made vacant by Dr. Fracker's new assignment, has been a member of the Department of Agriculture under regular appointment since May 1930. The major portion of Mr. Gaddis' employment in the Department has been spent in Mexican fruit fly control. Prior to that, he was employed by the Department as an agent, being engaged in work incident to the eradication of the Mediterranean fruit fly from Florida. Early in the campaign against this pest he organized the road-traffic inspection maintained along the Georgia-Florida line and in western Florida along the Ochlockonee River. Later on he was assigned to similar work within the State of Florida where, in addition to the maintenance of road stations to enforce the quarantine on account of the Mediterranean fruit fly, he was responsible for the inspection in transit, at transfer points and at various ports in the peninsular section of Florida, of materials pertaining to that quarantine. Last March Mr. Gaddis was assigned to the Division of Cereal and Forage Insects and was given the responsibility of organizing the office maintained at Minneapolis, Minn., in connection with the campaigns for the control of grasshoppers and chinch bugs. The closing of this temporary office made him available for return to Washington. Before coming to the Department Mr. Gaddis was employed by the State of Georgia, where he was engaged in research in entomology and plant pathology and where he served as nursery inspector. In addition to the work formerly included in the Division of Domestic Plant Quarantines, Mr. Gaddis will direct the activities concerned with the eradication of citrus canker and the control of phony peach disease, two lines of work that have recently been added to that division by administrative transfer.

FRUIT INSECT INVESTIGATIONS

Further liberations of oriental fruit moth parasites.--H. W. Allen and H. J. Haeussler, Moorestown, N. J., report that total liberations for the season of adult oriental fruit moth parasites produced by and shipped from the Moorestown laboratory, including the few colonies released prior to this quarter, were 56 colonies (26,725 adults) of the native *Macrocentrus ancylivorus* Roh., and 161 colonies (29,839 adults) of Japanese species. Of the imported species, there were liberated 67 colonies (8,705 adults) of *Bassus diversus* Mues., 34 colonies (6,688 adults) of *Diocles molestae* Uchida, 13 colonies (3,805 adults) of *Macrocentrus thoracicus* Nees., 29 colonies (8,916 adults) of *Phanerotoma grapholithae* Mues., 6 colonies (777 adults) of miscellaneous species, 4 colonies (656 adults) of *Orgilus longiceps* Mues., 2 colonies (200 adults) of *Phaeogenes* sp., and 1 colony (92 adults) of *Calliephialtes laspeyresiae* (Uchida). The total of *M. ancylivorus* and Japanese species released was 217 colonies of 56,564 parasites. Liberations of *M. ancylivorus* were made principally in Arkansas, Missouri, and Georgia by State agencies. The foreign parasites were, with few exceptions, liberated by Bureau workers, colonies being placed in Connecticut, New York, New Jersey, Pennsylvania, Maryland, Virginia, North Carolina, Ohio, Indiana, and Michigan.

Sealing protects figs from infestation and disease.--By sealing green Adriatic figs before the eyes were opened, C. K. Fisher and Perez Simmons, of the Dried-fruit Insects Laboratory, at Fresno, Calif., found that insect infestation and diseases were almost entirely prevented. In a lot of 190 figs that remained sealed for 2 to 3 months before being harvested dry, only 1.6 percent were found to be infested. Of an equal number of unsealed figs from the same tree 26.3 percent were objectionable. The sealing material, applied by hand from collapsible tubes, consisted of glucose, 59.3 percent by weight, gelatine, 6.8 percent, water, 33.9 percent, plus 0.1 percent benzoate of soda. These results represent the first success that has been obtained in experimental control of fig spoilage prior to harvest. It was found that a thick mixture of glucose, 4 percent gelatine, and water could be applied to green figs by means of a paint sprayer operating at a pressure of 30 pounds. Glucose-gelatine seals are viscous and nonpoisonous and are soluble in water.

Black pecan aphid prefers lead-arsenate-treated foliage.--Observations made by C. B. Nickels, in charge of the pecan-insect work at Brownwood, Tex., indicate that the presence of lead arsenate on the foliage favors infestation by the black pecan aphid (*Melanocallis caryaefoliae* Davis). Although the infestation was not severe, the trend was rather definitely indicated.

MEXICAN FRUIT FLY CONTROL

Still no Mexican fruit fly on Texas side of Rio Grande.--Trapping and fruit inspections in Texas groves during the month of September supported the results obtained in July and August, no Mexican fruit flies being observed. However, *Anastrepha fraterculus* Wied., *A. serpentina* Wied., *A. pallens* Coq., and two undetermined species of *Anastrepha* were trapped during the month in both grove and brush locations. No progress has been made in locating the native host of these species. This may be accounted for by the fact that Bumelia spiniflora, the plant most likely to be the host, has been practically barren of fruit for the past 6 months. Approximately 1,000 collections of native fruits have been placed in the pupation trays but to date have given negative results. Only four adult A. ludens were trapped in Matamoros, Mexico, during the month. However, an adult of a possibly new species was taken in one of the traps. This specimen was identical with adults reared by the Mexican inspector from mangoes originating near Vera Cruz and was very similar to the West Indian strain of fruit flies. Larvae of A. ludens, A. striata, A. fraterculus, A. serpentina, and Rhagoletis sp. were recovered from imported fruit exposed for sale on the Matamoros Market. The first shipments of the 1934-35 citrus crop left the Valley on September 27. In response to requests from the industry and in view of the fact that a considerable quantity of fruit had passed the maturity test, the shipping season was officially opened on September 26, rather than on October 1.

CEREAL AND FORAGE INSECT INVESTIGATIONS

New territory infested by European corn borer.--A. M. Vance, Arlington, Mass., reports that scouting for the European corn borer in 1934 has resulted in the establishment of new first records of infestation in the following five counties: Hamilton in Ohio, Somerset in Maryland, Sussex in Delaware, Cumberland in New Jersey, and Northampton in Virginia. This activity was conducted during the period from July 15 to September 15 by a field force of 9 scouts and 1 supervisor. It involved total travel of 51,794 miles and the examination of 2,982 cornfields, comprising some 29,585 acres in 90 counties. The territory examined lay principally along the outside border of that shown to be infested by the last survey, which was made in 1931-32. A large area was also scouted in Wisconsin, Illinois, Indiana, Kentucky, West Virginia, and Pennsylvania without additional infestations being discovered. Apparently the extreme drought in the Great Lakes States has kept the borer in abeyance there.

JAPANESE AND ASIATIC BEETLE INVESTIGATIONS

Japanese beetle larvae more abundant in summer of 1934 than in 1933.--In a seasonal series of larval surveys conducted by I. M. Hawley and H. Fox, Moorestown, N.J., diggings are made each week in sod at 8 stations in the older infested area, 4 of these stations being in New Jersey and 4 in Pennsylvania. From surveys in August it was apparent that the soil population in the older infested area as a whole was higher in 1934 than in 1933. Diggings in September continue to show a trend in this same direction. The increase in numbers in 1934 is largely in the Pennsylvania stations.

Mortality and disease in Japanese beetle soil populations in September.--There has been a gradual increase in the number of diseased larvae during the past 2 months. During the latter half of September 1933, diseased larvae made up 2.2 percent of the total soil population, as compared with 4 percent this year. Diseased grubs are now especially abundant at Tavistock, N.J., and Jenkintown, Pa.

Effect of arsenical treatment of evergreen and deciduous nursery stock in the field.--W. E. Fleming and F. E. Baker, Moorestown, report that in 1929 seedlings of various evergreen and deciduous trees and shrubs were planted equally in each of four plots of ground. One plot was left untreated, the second was treated with 1,000 pounds of acid lead arsenate per acre for control of Japanese beetle larvae, the third with 1,500 pounds per acre, and the fourth with 2,000 pounds per acre. The number of larvae per 1,000 square feet in these plots since they were established in 1929 were as follows:

Acid lead arsenate per acre	1929	1930		1931	1932		1933		1934
	Fall	Spring	Fall	Fall	Spring	Fall	Spring	Fall	Fall
	No.	No.	No	No.	No.	No.	No.	No.	No.
None	269	120	380	715	445	1197	1,474	755	1,233
1,000 pounds	265	90	0	5	0	2	0	0	0
1,500 do	198	20	0	0	0	0	0	0	5
2,000 do	120	100	0	0	0	2	0	0	2

There has never before been any indication of injury to either the evergreen or deciduous trees and shrubs in these plots. This fall, however, some browning of the tips of the needles on some of the evergreens was noticed, which might be an indication of arsenical injury to these plants. Samples of the needles or leaves from plants grown in both untreated soil and in soil treated with 2,000 pounds of lead arsenate per acre were analyzed to determine the arsenical content. The leaves from deciduous shrubs contained very little arsenic. Rose leaves contained more than those of any other shrub, but no evidence of injury could be detected. Of the conifers, however, _Pinus resinosa_ growing in the treated soil showed considerable injury to the tips and was found to contain 6 parts of arsenic trioxide per million, whereas none of the other varieties, with one exception, showed more than 1 part per million. The outstanding exception is the Douglas fir, the needles of which were found to contain about 59 parts of arsenic trioxide per million; but there was no indication of injury resulting from this rather high arsenical content.

Fumigation of fruits and vegetables in refrigerator cars to destroy Japanese beetles.--Tests have been conducted by J. W. Lipp, Moorestown, with hydrocyanic acid, carbon disulphide, and ethylene oxide in the fumigating house, under the conditions specified and with the quantities of chemicals recommended for fumigation of small fruits and bananas. Briefly, the results are as follows: Beets, eggplants, potatoes, onions, apples, peppers, tomatoes, carrots, and peaches were uninjured in all of the treatments. Lima beans became moldy after treatment with carbon disulphide and ethylene oxide, but were uninjured by hydrocyanic acid. String beans were also uninjured by hydrocyanic acid, but their appearance was marred by carbon disulphide and ethylene oxide. Although it is difficult to predict what might happen with the lower temperatures encountered in iced refrigerator cars, it is doubtful whether a complete kill of insects would result.

Control of the Japanese beetle in balled nursery stock.--Mr. Lipp reports that tests run with naturally infested azaleas by plunging them in soil containing paradichlorobenzene at the rate of 10 and 20 pounds per cubic yard showed a complete mortality of beetle larvae after exposure for 3 days or longer.

Preferences of Asiatic garden beetle for food plants and oviposition places.---Last spring plants to be tested were placed in the various compartments of a large cage. The middle of July 1,190 adult beetles were placed in the cage, 70 in each compartment. During the summer observations were made with a flashlight to determine the number of beetles feeding on the various plants. Chrysanthemums were entirely defoliated, feeding on peanuts was conspicuous, but little feeding was noted on the other plants. As the presence of grubs in the soil indicates the beetles' choice of places to oviposit, the soil in the compartments was dug up the middle of September to determine the population. In soil surrounding orange hawkweed, peanuts, clover, and strawberry grubs were sufficiently abundant to cause root injury as soon as they became a little older. The average numbers of grubs per square foot in these compartments were as follows: Orange hawkweed 38, peanut 34, clover 19, and strawberry, 16.

Control of Asiatic garden beetle grubs in strawberry beds.--In order to obtain additional data on a cultural method of grub control, strawberries were set out in four compartments of the cage described above. In two of these compartments the plants were mulched with 2 inches of hay during July and August and the other two compartments were left unmulched, as checks. In the mulched plants 32 grubs were found and in the unmulched strawberries there were 189. The mulching of the plants, therefore, resulted in an 83-percent reduction in the grub population. In a similar test in 1933 a 65-percent reduction in population resulted from the use of mulch. Grubs have caused caused considerable injury to strawberries on Long Island during the past few years. Some growers have used mulch as a cultural practice to conserve moisture and keep out weeds and, in view of the results given above, mulching would appear to be a wise procedure in places where the beetle population is heavy.

JAPANESE BEETLE CONTROL

Japanese beetle quarantine on fruits and vegetables lifted.--Disappearance of the adult Japanese beetle from agricultural regions producing quarantined fruits and vegetables led to the lifting, effective on and after September 16, of the seasonal restrictions on the movement of these articles. This action advanced the date prescribed by the regulations for the termination of this regulatory activity from October 15 to September 16. As cut flowers continue to be likely carriers of the adult beetle, the requirements for inspection and certification of this commodity will remain in force until October 15.

Eradication campaign in Erie, Pa., further reduces infestation.--Another progressive reduction in the number of Japanese beetles captured in Erie, Pa., was recorded as a result of this year's trapping in that city. A total of 1,427 traps was in operation from July 6 to September 8, the largest concentration of traps ever set in the city. Captures in the city in successive years have been as follows: 1931, 171; 1932, 232; 1933, 167; and 1934, 114. Of this year's total, 43 specimens were taken where infestations were discovered in 1933 and first treated in the fall of that year.

Most of the other captures represent spread not previously determined. The significant feature of the control work in Erie is that intensive trapping in the older infested section of over 44 acres, where the soil has been poisoned for a period of 2 or more years, has disclosed only 3 beetles emerging from the entire area.

Japanese beetle infestation in Maine unaffected by subzero temperatures.--Although Waterville, Maine, was included within the regulated zone in an extension of territory resulting from the spread determined in 1933, trapping was repeated there this year to learn whether the past winter's record-breaking cold weather had killed off the overwintering grubs. Instead of 204 traps being operated for 30 days, as in 1933, this year 300 traps were set for 40 days, and whereas last year 139 beetles were trapped, this year's captures increased to 299.

Soil treatments at St. Louis, Mo.--Funds were recently made available by executive order for the application of thorough control measures in all sections of St. Louis infested with the Japanese beetle. This work was begun on September 26 and will probably continue until late in October. Approximately 250 tons of lead arsenate are available for treating 117 infested blocks at the rate of 1,000 pounds per acre. This is the largest control program ever undertaken at an isolated infestation.

Gypsy moth infestation in laurel compels revision of inspection procedure.-- Presence this year of large numbers of gypsy moth egg clusters on laurel has led to a revision of the procedure by which this commodity may be certified. Quantities of laurel are annually used for roping, wreaths, and funeral pieces, particularly at the Christmas season. It was found that the egg clusters remained on the leaves or twigs despite several handlings while they were being woven into roping. Gypsy moth egg clusters have also been found on cut laurel recently submitted for inspection from southern New Hampshire, four egg clusters having been removed from the material after its shipment to Boston for reshipment to nonregulated territory. Laurel branches in large quantities or leaves and twigs that have been processed into decorative pieces cannot be satisfactorily inspected. In the future, actual inspection will be granted only for small quantities that can be carefully examined in a short time. No inspections of processed articles will be attempted. Inspection of laurel will be made on the "lot" basis. Entire uninfested sections within which it is safe to pick laurel will be designated after thorough scouting of the locality. Shippers who desire to manufacture decorative articles containing laurel for movement from the regulated zone will be obliged to confine their purchases to pickers who have obtained their material from the uninfested sections.

Gypsy moth quarantine regulations revised.--For the first time since 1931, changes have been effected in the areas infested by the gypsy moth. The revision was approved on September 27 to become effective on October 2. Freedom from infestation, as evidenced by the inspection of millions of Christmas trees over a period of years and supplemented by observations of district inspectors continuously stationed in the affected areas, made it possible to release from quarantine certain towns adjacent to the Canadian border and along the northwestern boundary of the lightly infested territory in Vermont. On the other hand, due to the increasing intensity of gypsy moth damage in other portions of the regulated area, the designation of a number of towns in Maine, New Hampshire, Vermont, and Connecticut was changed from lightly infested to heavily infested.

New England road-inspection station opened.--The stationing of a road inspector on the Mohawk Trail near Savoy, Mass., at the border of the lightly infested gypsy moth area, has resulted in the interception of numerous uncertified shipments of nursery, forest, and evergreen products. The station was established on September 12. Small lots of quarantined products are inspected and certified at the post.

European corn borer infestations noted in Virginia and on Long Island.--State nursery inspectors scouting on the Eastern Shore of Virginia during the latter part of September reported a rather wide-spread infestation of the corn borer. Practically all of Accomac and Northampton Counties were scouted and found infested. In some fields 50 percent of the stalks were infested. Scouting of the mainland area of the State failed to disclose any infestation. Inspection by a Federal inspector of Long Island dahlia fields, including large acreages in which nearly a million tubers and many thousands of young plants have been set, disclosed infestations of the corn borer in almost every field.

Differentiation of Dutch elm disease from other infections easier this fall than last.--Elms infected with Graphium, Verticillium, and Cephalosporium now show better external symptoms of the specific causal organism than was the case last year. This year foliage began to turn yellow and fall about September 20, whereas last year discoloration and fall of leaves did not begin until about October 15. Verticillium-infected trees observed late in September showed less discoloration and better size and color of foliage than did trees infected with Cephalosporium and Graphium. The observations were made on trees that first showed symptoms of the diseases early this season, making possible observations of differential defoliation caused by each disease. More efficient scouting can be done this fall, as selection of trees for sampling is much simpler in the elms that exhibit general defoliation and wilting.

FOREST INSECT INVESTIGATIONS

Insect damage to thinned ponderosa pine stands.--L. G. Baumhofer, of the Coeur d'Alene, Idaho, field laboratory, reports that in the Black Hills of South Dakota workers from the C.C.C. camps have thinned more than 50,000 acres of young ponderosa pine to relieve overcrowded stands. The principal bark beetle breeding in the slash is Ips oregoni Eich., which normally prefers freshly cut material but when very numerous is capable of killing healthy young pine. In 1933 no Ips damage occurred but in 1934 when the beetle population was large, several instances of damage were reported. In a recent examination it was found that the killing occurred in areas isolated 2 or more miles from previous operations, where cutting had been started early in the summer. The proposal to take a million fence posts out of the Black Hills for the Great Plains Shelter Belt Project may offer a solution in regard to Ips control. All infested material removed from the stands and not peeled could be burned, thus reducing the beetle population.

New infestation of beech scale.--C. W. Collins, of the Melrose Highlands, Mass., field laboratory, reports that in September R. P. Marshall of the Division of Forest Pathology, Bureau of Plant Industry, found beech trees infested with Cryptococcus fagi Baer. in Hartford, Conn. This is the first time that the scale has been noted in Connecticut, the nearest known infestation being in Boston, Mass., and immediate vicinity. Some scouting was done in Hartford by members of the Melrose Highlands, Mass., laboratory during the last week of September, and a total of 116 infested trees were found. The infestation is apparently confined to the central portion of the city and is of several years standing.

Beech scale winter-killed in Maine.--Regarding observations made during the month in sample plots established in Maine during the fall of 1933 for observations on the beech scale, R. C. Brown, Melrose Highlands, states that the infestation has been reduced to a minimum in practically all of the plots. This is unquestionably due to the high mortality caused by the low temperatures of the past winter and by the feeding of the twice-stabbed ladybeetle. Most of the living scales found were at the bases of the trees, less than 2 feet from the ground, where they had been protected by snow last winter. Chilocorus bivulnerus Muls. was especially effective as a control agent in those areas where a heavy scale infestation and a large beetle population were present in 1933. With an abundance of beetles and a light infestation of the scale this year the infestation was very markedly reduced. Mr. Brown estimates that 90 percent control was effected on many trees, and practically complete control on some trees in southeastern Maine.

Three generations of the imported willow-leaf beetle in Massachusetts.--C. E. Hood, of the Melrose Highlands, Mass., field laboratory, has been studying the biology of Plagiodera versicolora Laich. in a screened insectary during 1934. Beetles that had hibernated were collected in the field on May 7. Consideraing the beetles that developed from eggs laid by the collected beetles as being of the first generation, there were three complete generations and a partial fourth during the year. Only a very small percentage of the females of the third generation deposited eggs.

White grubs in forest nurseries.--R. A. St. George, Asheville, N.C., reports that in the 6-week period from August 15 to October 1 white grubs have become quite injurious in the two State forest tree nurseries at Clayton, N.C., and Camden, S.C. The losses to loblolly and slash-pine beds have been considerably more serious than to those of long-leaf pine. Black locust seedlings have been attacked but, perhaps because of their more extensive root systems, have suffered much less. In order to determine the vertical distribution of the white grubs, an examination was made of 25 square feet in each of two nursery beds of loblolly pine. By removing the soil in thin layers the following distribution of the grubs was disclosed: 56 percent in the uppermost 2 inches, 30 percent in the second 2 inches, 12 percent in the third 2-inch layer, and 2 percent at depths of from 6 to 10 inches.

Pine stands thinned by girdling not endangered by insects.--Recent reports from the Ozark National Forest, where second-growth shortleaf pine stands were heavily thinned by hack girdling, state that such treatment, after a period of 1 year, has not resulted in insect attacks on crop trees to any appreciable extent. The greatest disadvantage in such a method is that trees of small diameter, 6 inches diameter-breast-height and under, are readily blown over. On one plot approximately 50 percent of the girdled small trees were blown over, whereas the trees of larger diameter rarely went down.

The balsam woolly aphid in the Northeast.--H. J. MacAloney, of the New Haven, Conn., field laboratory, has made a preliminary survey of the New England States to determine the distribution of the balsam woolly aphid, or fir bark louse (Adelges piceae Ratz.) which has been considered the chief cause of the wide-spread mortality of balsam fir in Maine, New Brunswick, and Nova Scotia. He has found it generally prevalent in northern New England wherever balsam fir is found in Maine, New Hampshire, and Vermont, and in several localities in Massachusetts, including the Berkshire Hills. Both the twig-infesting form and the more common form on the trunk and limbs of larger trees were common in all areas. All sizes of balsam were infested, and trees in all sites, whether in pure stands in sour sphagnum bogs or in mixed stands on well-drained soil, were equally susceptible. One report of infestation in New York has been received and scouting will be undertaken in that State.

GYPSY AND BROWN-TAIL MOTH CONTROL

Gypsy moth work in September.--In the New England area 14 infestations, totaling 1,920 egg clusters, have been discovered to September 30, inclusive. In the Pennsylvania area September scouting was concentrated in the lowlands along the Susquehanna and Lackawanna Rivers, in order that all egg clusters deposited on the lower parts of tree trunks, small brush, and debris might be located and destroyed by creosote before heavy rains, which usually occur in the fall and spring, cause the rivers to overflow their banks. It was feared that flood waters might wash infested debris downstream and that infestations might thus become established outside of the area now infested. Twenty-four infestations were found, and 3,173 egg clusters were destroyed by creosoting. Several of these infestations were located on tin cans and rubbish. These findings emphasize the importance of scouting the lowlands in the early fall while the rivers are relatively low. In the latter part of September employees of the State of New Jersey, engaged in gypsy moth work, located two egg clusters near the site of an assembling cage in Morris Township, where 12 male moths were trapped during the summer. These employees are examining tree growth on the west side of the George Washington Bridge, near Fort Lee, N.J., in an effort to determine whether or not the infestation discovered in the Bronx during the latter part of July, extends westward to that region. No infestation has been found to date. Gypsy moth work in C.C.C. and V.C.C. camps has continued during the month in 1 camp in Vermont, 10 in Massachusetts, and 7 in Connecticut. Most of the work during the summer was the patrolling of burlap bands in order to kill gypsy moth caterpillars, pupae, and female moths. It resulted in the killing of 539,034 gypsy moths in one form or another. Approximately 30,000 trees have been examined. Over 94,000 egg clusters have been treated, 72,500 being in Massachusetts, 15,300 in Connecticut, and 5,900 in Vermont.

PLANT DISEASE CONTROL

Barberry eradication, seasonal summary.--Barberry bushes in the eradication area did not rust heavily during May and the early part of June, therefore inoculum from local sources was less plentiful than usual. The first infection took place during the latter part of May and developed slowly. A second and heavier wave of infection occurred on barberries during the second week in June. However, the resulting local spreads to grain were soon overshadowed by the more general spread from south to north. During the winter of 1933-34 the uredinial stage of stem rust survived in several areas in Texas. In at least one locality (north of Dallas) inoculum increased rapidly in April, and by May 12 rust spores were found on slides exposed at Oklahoma City, Okla., and Wichita, Kans. Collections of stem rust of wheat and oats made later in these two States confirmed this date as the probable time infection took place. However, from the middle of May on through the season, the development of rust was noticeably retarded by the premature ripening of crops and by general conditions attending the drought. The first stem rust was found in Minnesota away from barberries on June 22. Its stage of development at that time indicated that the initial infection occurred about the 6th or 7th of June, when one of the few early summer rains occurred. Rust appeared in central Minnesota, South Dakota, and southern North Dakota a week later. The spread of the disease, however, was limited to localities where there had been sufficient moisture to keep crops in a succulent condition. The fact that rust could be found wherever crops in Minnesota and the Dakotas developed normally indicated that inoculum was present and that lack of spread was due in part to existing climatic conditions. In stem-rust specimens collected from Mexico to the Canadian border forms 38, 49, and 56 were found to be prevalent. These forms were noticeable in Mexico early in the spring, and the belief that a rather rapid northward movement of spores took place during May and early in June was borne out by the fact that the same forms were quite prevalent in the Northern States later in the season. Weather conditions were not favorable for the development of either the grain or the fungus, and preliminary estimates indicate that the disease caused very little damage. Recent observations indicate that the fall infection on volunteer grain and native grasses in the Midwestern States is heavier than normal.

Blister rust control work covers 752,000 acres in Northeast.--Preliminary reports indicate that during the field season of 1934 about 752,000 acres in the Northeastern States have been cleared of over 22,000,000 wild Ribes plants and 27,000 cultivated bushes as a result of 205,369 man-days of labor. The control work has been conducted under four major programs--regular cooperative work, P.W.A., E.C.W., and E.R.A. In connection with the E.C.W., Ribes eradication was performed by labor from 107 C.C.C. camps.

Ribes-eradication season closes in California and Oregon.--Ribes-eradication work for 1934 was brought to a close in California in September. Eradication operations on the Stanislaus National Forest came to a close on September 5, on the Plumas on September 12, and on the Eldorado on September 13. On these three forests, 18,196,122 Ribes bushes were eradicated during the season and over 190,400 acres were covered. The Ribes-eradication season in Oregon was terminated on September 21. A total of 24,703 acres of white pine and sugar pine had been treated and 2,574,289 Ribes plants had been eradicated.

September weather aids blister-rust infection.--The spread of blister rust from Ribes bushes to white pines in unprotected areas in the Northeastern States was favored from June to September by prolonged periods of cool, moist weather. In September, conditions were especially favorable for the spread of the disease in many parts of this region. According to the Boston Weather Bureau, September was the darkest month in its history, there being only 118 hours of sunlight out of a possible 350. Rain fell on 15 days of the 30. The total rainfall for the month was 5.67 inches, and the temperature averaged 64.6° F. The pine infection that originated in 1934 will not become fully apparent, however, until 1937, as the disease requires a 3-year incubation period on pine before the blister stage is developed.

Blister rust infection becoming well established on pines in New Jersey.--Prior to 1934, blister rust had not been reported on native white pine in New Jersey and very little Ribes-eradication work had been performed, except in the environs of the State nursery. However, recent scouting by two Federal agents in the northwestern part of the State revealed well-established pine infections in three townships. In Montague, 20 infected pines were located, most of the cankers being of recent origin. Five additional diseased pines were discovered in Vernon, one of them being a 24-year-old tree that had been killed by the rust. In West Milford, heavy infection was found to extend throughout an area comprising 15 acres of pine, ranging in age from 5 to 30 years. At least 20 percent of the pines in this tract are diseased with cankers whose origin dates from 1925 to 1932. In certain parts of the area over 50 percent of the pines are infected. The source of this infection was a patch of cultivated Ribes nigrum (destroyed several years ago) and R. rotundifolium growing in abundance throughout the area. Spot pine infections of recent origin were also located in four other blocks in West Milford. Last summer 2,712 acres of pine in the townships of Montague, Sandyston, and Wallpack were protected from additional blister-rust infection by the eradication of 22,626 wild Ribes bushes and 859 cultivated ones.

New blister rust infections.--R. A. Sheals and State leader O. J. Dowd recently found blister rust in Ashtabula County, Ohio, on Ribes nigrum bushes. No infection on white pine was located. Mr. Dowd reports that during September 73,202 Ribes bushes on 4,935 acres were eradicated in the State. In Iowa blister rust was found this summer both on white pine and on Ribes in the

Pine Hollow area in Dubuque County. Fifteen R. cynosbati bushes were found spotted with infection, and one white pine with three cankers was found, the infection being 3 or 4 years old. On September 2, two blister rust scouts in Maryland found blister rust infection on gooseberries in Allegheny County. There were probably 100 bushes scattered over about 3 acres and each bush was heavily infected, in some instances the infection amounting to 90 percent of the leaves. With the exception of infection found on black currant at Frostburg in 1931, this is the first blister rust infection in this county. Infection was also found recently near Norbeck in Montgomery County on European black currant bushes.

COTTON INSECT INVESTIGATIONS

Unusual insects on cotton this season.--According to F. F. Bondy and C. F. Rainwater, Florence, S.C., the cowpea aphid (Aphis medicaginis Koch) has caused considerable injury to young cotton throughout the Pee Dee section of South Carolina. This species has been more abundant on cotton at Florence this summer than has Aphis gossypii Glov. Mr. Rainwater found the leaf hoppers Empoasca fabae Harr. and Alconeura unipuncta Gill. very abundant in sweepings at Florence from June to September, and J. G. Watts found them very abundant at Clemson College. Feeding scars presumably caused by these species were noticeable in many fields. Anomis flava fimbriago Steph. and Anomis sp. (erosa Hbn.?) caused some injury to squares at Florence. The salt marsh caterpillar (Estigmene acraea Drury), at times a locally important cotton pest in Texas and Arizona, caused some injury to leaves at Florence. Cutworms (Feltia sp.) caused much local damage in some fields at Florence by cutting off the young cotton plants just under the surface of the ground.

Survey of boll weevil parasites.--Extensive collections of infested cotton squares were made by employees and State collaborators in the South Atlantic States and on a smaller scale in the cotton sections west of the Mississippi River and the northern part of the Belt. F. M. Gilmer, Tallulah, La., reports that, although all tabulations and identifications are not complete, the parasitization was found to be very low again this year. From 103,592 squares caged, an average parasitization of 1.80 percent was obtained. The highest parasitization in any lot of squares was 18.27 percent, and only 8 percent of the lots showed more than 10 percent parasitization. Microbracon mellitor Say was by far the most abundant of the dozen or so species taken, constituting approximately 80 percent of the total number of parasites.

Parasites of pink bollworm.--A. J. Chapman, L. W. Noble, and W. T. Hunt, of the Presidio, Tex., laboratory, report that no recoveries have been made to date in the fields of the Big Bend district where the pink bollworm parasites Exeristes roborator Fab. and Microbracon mellitor were liberated last season. Breeding work has been continued and, at the request of the Mexican Department of Agriculture, 5,000 spin-ups of E. roborator were shipped to the Laguna district of Mexico during the latter part of July and 6,000 Microbracon brevicornis Wesm. to Camargo, Chihuahua, for colonization. E. roborator has since been recovered in the fields where it was liberated this season. The Mexican Department of Agriculture and the cotton planters of the Laguna district have contributed the money for the construction of a parasite-rearing laboratory at Torreon, Coahuila. This work will be under the supervision of the Mexican Department of Agriculture, and Sr. Juan Montúfar has been detailed to visit Presidio to acquaint himself with the methods used in breeding the parasites.

Flea hopper a serious cotton pest.--K. P. Ewing and R. L. McGarr, Port Lavaca, Tex., report that the average production of cotton in Calhoun County will be around 175 pounds per acre, the lowest in many years if not the lowest on record. This extremely low yield was due to early damage by flea hoppers, to the hurricane on July 25, to the heavy infestation of leaf worms during the latter part of July and August, and to boll weevil injury to late cotton.

Flea hopper control tests.--Fifty-four 1-acre plats were dusted this season. The three principal insecticides tested were (1) sulphur (200-mesh), (2) a mixture of 75 percent calcium arsenate and 25 percent wet-mixed paris green, and (3) sodium fluosilicate. Other insecticides tested were calcium arsenate, a mixture of molasses and calcium arsenate, and different proportions of sulphur with wet-mixed calcium arsenate and paris green. A count of damaged bolls showed that, although the average percentage of loss was about the same in the treated and untreated plats, the estimated loss in pounds of cotton per acre was 84.2 in the checks, 290.8 in the sulphur plats, 272.9 in the plats treated with the calcium arsenate-paris green mixture, and 108.3 in the sodium-fluosilicate plats.

Insects and cotton-disease transmission.--L. D. Christenson, College Station, Tex., reports: "The contention that insects are disseminators of cotton wilt disease is supported by results of cultures of insects collected in badly wilted cotton. It has been found that a rather high percentage of the orthopteron fauna (principally Locustidae) are natural carriers of viable spores of *Fusarium vasinfectum*. * * * In a field of badly wilted cotton at Beaumont, Tex., 33.3 percent of the grasshoppers examined carried the fungus internally. In a field located 2 miles south of College Station, Tex., 12.8 percent of the grasshoppers present on July 30, 1934, contained *Fusarium vasinfectum*. By September 14 the occurrence of the wilt organism in grasshoppers in the same field had increased to 28.7 percent. Species of grasshoppers in the field in which the fungus in question has been found in a viable state, as evidenced by positive results of cultures made, may be listed as follows: *Melanoplus mexicanus* Sauss., *Melanoplus differentialis* Thos., *Schistocerca americana* Drury, *Schistocerca obscura* Fab., *Encoptolophus texensis* Brun., *Spharagemon cristatum* Scudd., *Tomonotus aztecus* Sauss., *Chortophaga viridifasciata* De G., *Dissosteira carolina* L., *Trimerotropis citrina* Scudd., and miscellaneous grasshopper nymphs."

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

More on gin-trash inspection.--The finding of new infestations at Bascom, in Jackson County, and at Live Oak, in Suwannee County, Fla., by gin-trash inspection, was mentioned in the last number of the Bureau's News Letter. Since then intensive inspections have been made in these counties and also in nearby counties in Florida, Alabama, and Georgia. Since the original findings, 5 additional specimens have been taken in Suwannee County and 6 in Jackson County.

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On September 26 a specimen was found at Cottondale, in Jackson County. Both of these counties were added to the regulated area on September 19. On September 20 a pink bollworm was found at Greenville, in Madison County, which was already under regulation, 1 specimen having been found at a gin at Madison last year. On October 2 a specimen was found in trash at Williston, in Levy County, just south of the older regulated area. On October 4 a specimen was found at Live Oak in cotton grown in Hamilton County, the trash having been caught separately by the ginner. It was possible to locate the field in which this cotton was produced, and some field inspections have been made but no additional specimens found to date. Gin-trash inspection in Alabama and Georgia has given negative results. Some field inspection has also been carried on in southeastern Alabama by State employees, also with negative results. In Texas gin-trash inspection is being carried on in the regulated area of the Western Extension and in a number of counties just outside. The supply of trash has been plentiful. Inspections in Mexico have been completed. They were carried on in the Don Martin Project, at Nuevo Laredo, the San Carlos Project, across the river from Del Rio, Tex., and at Piedras Negras, opposite Eagle Pass, Tex. Gin-trash inspection is also now under way in the Thurberia weevil area in Pima County, Ariz., and in the Salt River Valley of Arizona, which was released from the regulated area last December. Results have been negative in all of the above inspections. In the Big Bend area of Texas several State employees have been making gin-trash inspections when not engaged in other duties. To date these men have inspected trash from some 58 bales of cotton. From the extreme lower end of the Presidio ginning territory 145 worms per bale were found, 132 in the section just below Presidio, 390 in the section just above Presidio, and 183 in the upper end. These findings indicate that the infestation is much lighter than last season, as was also indicated by the trap-plot results.

Inspection station reopened.--The road station just south of Marfa, Tex., was reopened September 1. This station guards the main roads leading from the Big Bend area, and is being operated on a 24-hour basis, two inspectors being furnished by the State Department of Agriculture and two by this project. During September 15 cars were found carrying contraband material, none of which was infested by the pink bollworm.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Russian thistle control in California.--F. R. Lawson, of the Modesto, Calif., field laboratory, reports that results of the program conducted in 1933 by the C.W.A. in Stanislaus County, Calif., for Russian thistle control, indicate great reduction in the acreage of this favored wild host of the beet leafhopper. The actual reduction in leafhopper population in this area is 53.2 percent over that of 1933. However, in Merced County and in the uncontrolled portion of Stanislaus County, leafhopper populations have increased 64.9 percent over those of 1933.

Mole cricket in strawberries and truck crops in North Carolina.--W. A. Thomas, of the Chadbourn, N.C., field laboratory, reports that the mole cricket (Scapteriscus vicinus Latr.) has been particularly abundant in strawberry fields and in areas of fall-grown truck crops in North Carolina. Many growers are using the standard poisoned bait in strawberry fields to check the activities of this insect.

Wild gourd plant attracts cucumber beetles.--R. E. Campbell, of the Alhambra, Calif., laboratory, reports excellent results in attracting three species of cucumber beetles by utilizing the vegetative portion (macerated) of a wild gourd plant, Cucurbita foetidissima Hbk., as an attrahent. During a 24-hour period of exposure in a squash field, approximately 2,300 beetles were attracted to 32 baits composed of this plant. The species concerned were Diabrotica soror Lec., D. trivittata Mann., and D. balteata Lec.

Five species of Diptera reared from tomatoes in Maryland.--R. H. Nelson, of the Greenhouse Insects Laboratory, Arlington Farms, Rosslyn, Va., continuing studies on maggots often found in canned tomatoes, reports that he has recently reared five dipterous species from tomatoes collected in commercial plantings and canneries in Maryland. Drosophila melanogaster Meig. is by far the most common.

Dusting gives good control of tomato hornworm.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that 12 different insecticidal dusts were tested against tomato hornworms (Phlegethontius sexta Johan.). Under cage conditions calcium arsenate, cryolite, barium fluosilicate, and a derris dust containing 0.5 percent rotenone mixed with talc, were toxic to the full-grown worms.

Weather believed a factor in control of tobacco hornworms by poison feeders.--F. S. Chamberlin, of the Quincy, Fla., laboratory, reports that eight feeders per acre were placed in two fields of shade-grown tobacco containing 13 and 14 acres, respectively, for the control of the tobacco hornworms. Low temperatures and rainy weather prevailed in the early part of the season and the feeders gave little apparent protection. As the season progressed, the protection afforded by the feeders became more pronounced. The apparent reduction in hornworm infestation for the season was 50 percent, as compared with 83 percent for 1932 and 62 percent for 1933. This decrease may be attributed either to the cool, rainy season or to the decreased number of feeders used per acre.

Poisoned baits control tobacco budworm.--According to a report submitted by Mr. Chamberlin, excellent control of the tobacco budworm was obtained during 1934 in the Quincy area by the use of a poisoned bait consisting of 1 part of lead arsenate and 75 parts of corn meal, by weight. Comparative tests demonstrated that derris could not be substituted for the arsenical in this treatment.

Effectiveness of derris-sulphur dust against melon and pickle worms.--M. M. High, of the Biloxi, Miss., field laboratory, reports that in tests made early in the season against the melon worm and the pickle worm on summer crookneck squash, 7 applications at weekly intervals of a mixture of derris, sulphur, and clay dust (1-2-1 parts by weight), containing approximately 1.5 percent rotenone, resulted in a reduction of 60 percent in infested fruits, as compared with untreated plants. The first 5 treatments were applied at rates of 12 to 15 pounds per acre per application and the last two applications at rates of 20 to 40 pounds per acre per application. Similar tests indicated a reduction of 57 percent in infested cantaloup fruits in treated plots, as compared with fruits in untreated plots. The dusting mixture burned the leaves of young cantaloups severely and in general was not as effective on these plants as on summer squash. W. J. Reid, of the Charleston, S.C., field laboratory, reports that in experiments with these two pests under South Carolina conditions, a dust mixture consisting of derris root powder containing 1 percent rotenone, with sulphur and pulverized clay as diluents, reduced a heavy infestation of melon and pickle worms on squash approximately 88 percent, while on cucumbers and cantaloups control of approximately 86 percent was obtained. Four applications were made at an average rate of 16 pounds of the dust mixture per acre. Dust mixtures containing 0.5 percent rotenone showed considerable toxicity to the insects but were not as effective as the 1 percent mixture. A dust mixture composed of 50 percent calcium arsenate, with sulphur and clay as diluents, proved slightly inferior in toxicity to either the 1.0 percent or the 0.5 percent rotenone dust.

Insecticides effective against lima bean pod borer.--Rodney Cecil, of the Ventura, Calif., field laboratory, reports that barium fluosilicate, cryolite (natural or synthetic), or potassium hexafluoaluminate, applied at a concentration of 80 percent, gave control ranging from 67 to 94 percent, as compared with the untreated check plots. These tests were conducted under practical field conditions and indicate a possible control for this pest.

Efficiency of derris dust mixtures against pea weevil.--The results of an extensive series of laboratory tests by T. A. Brindley, of the Moscow, Idaho, field laboratory, demonstrate that derris-dust mixtures containing 1.0 percent rotenone or pyrethrum-dust mixtures containing 0.9 percent total pyrethrins, applied at the rate of 20 pounds per acre, with diatomaceous earth as a diluent, killed a satisfactorily high percentage of pea weevil adults.

Curly-top damage curtails sugar beet production in Colorado and Idaho.--W. A. Shands, of the Grand Junction, Colo., field laboratory, reports that curly-top disease caused by the beet leafhopper in the two main beet areas on the western slope of Colorado continued to increase during the summer until by the end of September practically 100 percent of the plants were infected. Although most of the acreage in this area is planted to so-called "resistant" sugar beets, it is anticipated that the tonnage yield on the western slope will be considerably less than in 1933. J. C. Chamberlin, Twin Falls, Idaho, reports that current estimates (August 25) received from the Amalgamated Sugar Company indicate that the total yield of sugar beets for the Twin Falls and Burley areas in Idaho will not exceed 12,000 to 20,000 tons, as compared with a yield of 351,000 tons for the same areas in 1933. Curly-top disease has probably been the most influential factor in causing this reduction, but the shortage of irrigation water as a result of the general drought has been a contributing factor.

Pea moth causes severe damage in Washington State.--According to a report submitted by C. F. Doucette, of the Sumner, Wash., field laboratory, the pea moth is causing heavy losses to pea growers in Whatcom and Skagit Counties, Wash. In a conference with Arthur Hanson, entomologist at the Western Washington Experiment Station, Puyallup, Wash., Mr. Doucette learned that some plantings of peas in the above-mentioned counties have been so heavily infested that it was very difficult to find a single pod free from infestation.

Life history of lily thrips in Northwest.--Ralph Schopp, Sumner, reports that an increase in the population of adults and a decrease in that of the earlier instars, particularly in the first instar, from the middle of August to the end of September, indicates that egg laying had almost stopped. Adults dispersing at the same period suggest a possible relationship. Apparently there have been two broods thus far this season.

Derris dust effective against harlequin bug on turnips.--J. U. Gilmore, of the Clarksville, Tenn., field laboratory, reports that in preliminary tests, dust mixtures containing 3.2 percent rotenone with tobacco dust as a diluent, applied at the rate of 15 pounds per acre, resulted in a mortality of 75 percent of adult harlequin bugs on turnips within a period of 24 hours.

Hot-water treatment controls iris thrips.--F. F. Smith, of the Greenhouse Insects Laboratory, Washington, D.C., continuing his studies on the iris thrips (Bregmatothrips iridis Watson) on Japanese iris found that on plants immersed for 30 minutes in water at 110° F. at the Brooklyn Botanic Gardens all thrips had been killed.

Spraying for control of red spider and thrips on cucumbers in greenhouses.--C. A. Weigel and H. H. Richardson, of the Greenhouse Insects Laboratory, Washington, D.C., report that in a practical test with a power sprayer, using derris 1-2,500 and sulphonated castor oil, 1-400, the spray was mixed in the 200-gallon power sprayer and applied at 400 pounds pressure with a 3-nozzle disk sprayer on a rod. The application was made as thoroughly as practically possible, with a total of about 35 gallons to 200 cucumber plants that were from 7 to 9 feet high and that had very dense foliage. The spray gave 95 percent control for the red spider mite and 96 percent control for the thrips. The addition of pyrethrum extract (1-444 and 1-660, which is equal to pyrethrum 1-20,000 and 1-33,000, respectively) to the spray, appeared to add little to effectiveness against the red spider but it did add slightly to effectiveness against the thrips.

Tuberoses tolerant to hot-water and vapor-heat treatments.--Reporting on the effectiveness of hot-water and vapor-heat treatments against the bulb mite in tuberoses, Mr. Weigel and R. H. Nelson state that in the tolerance phase of this work it was found that on the whole stands ranging from 95 to 100 percent of the tuberoses were obtained following the various treatments given. In most of the treatments the results are equal to those of the checks and apparently the bulbs are not affected adversely by any of the treatments.

Kerosene emulsion continues effective against Mexican mealybug.--Mr. Richardson, in further tests with a 10 percent kerosene emulsion at 100, 200, and 300 pounds pressure, gave very high mortality of the active stages of the Mexican mealybug (*Phenacoccus gossypii* T. & Ckll.). This control measure is particularly useful in pompon chrysanthemums grown in beds out of doors under cloth shelter. No injury to the plants is apparent. The chrysanthemum aphid, usually present at this time of the year, is also killed by this treatment.

Recoveries of Mexican bean beetle parasite.--N. F. Howard and B. J. Landis, of the Columbus, Ohio, field laboratory, report that during the season of 1934 approximately 6,300 adults and puparia of the imported tachinid parasite *Paradexodes epilachnae* Ald. were bred and liberated at various points in Alabama, Virginia, and Ohio. During the rearing operations a total of approximately 13,000 parasite puparia were obtained and 7,200 adults emerged. Recovery collections made at Birmingham, Ala., and at South Point, Ohio, demonstrated that the parasite had become established. Collections made at Chattanooga, Tenn., Newark, Del., and Athens, Ohio, where liberations were made in 1933 but not in 1934, indicated that the parasite had not survived in these localities.

INSECTS AFFECTING MAN AND ANIMALS

Screw worm situation in Southeastern States.--Serious and wide-spread screw worm infestations are now prevalent in Georgia, Florida, Alabama, Mississippi, and Louisiana, and numerous calls for aid in controlling the situation have been received. In several localities stockmen reported infestations as high as 50 percent of the sheep and 25 percent of the cattle. The farmers and stockmen of these States, unlike the ranchmen in western Texas, have had little or no previous experience with this pest and were totally unprepared for it when it struck. Preliminary to mapping out control campaigns a survey of the extent of infestation in each State was made by Bureau men. While this work was under way tentative arrangements were made with the F.E.R.A., whereby a portion of the funds allotted by that organization to the affected States might be used for screw worm control. These arrangements have been perfected in Georgia, Florida, Alabama, and Mississippi, and control campaigns are now under way in those States. With the exception of Alabama, where the work is being directed by the State Veterinarian, the leadership and direction rests with Bureau representatives. In Georgia W. E. Dove and R. A. Roberts are directing a force of 28 supervisors; in Florida W. V. King and G. H. Bradley are directing 29; and in Mississippi D. C. Parman and O. G. Babock have a force of 18.

Breeding places of the stable fly.--W. V. King reports that after a 2-weeks search for breeding places of *Stomoxys calcitrans* L. in the vicinity of Panama City, Fla., during September, larvae were finally obtained in moist collections of two species of brown algae of the genus *Sargassum*. This type of algae appears to develop only in the open Gulf and is found only along the Gulf beach and near the inlets. It was locally reported as appearing annually in the sea water during June, July, and August, with the subsequent formation of drifts along the beach. Apparently the breeding of the flies in this material might offer an explanation for the extremely heavy outbreaks that occur nearly every year during September and October along this particular stretch of coast.

Tests with stained mosquitoes.--In a series of tests for the purpose of gathering data on longevity and flight range of western species of Aedes, H. H. Stage, Portland, Oreg., and his assistants have captured by various methods a total of 16,914 adult mosquitoes during this season. Of these only 15 proved positive for traces of stain. No adult was recovered during the season at a greater distance than 1 mile from the point of staining, and the longest span of life recorded was 39 days after staining. Recoveries were made at points both with and against the general wind currents, and across the Columbia and Willamette Rivers in both directions. In the three seasons during which these staining tests have been conducted a total of 27,813 adults have been captured. Of these 43 have shown traces of stain. The greatest distance covered by an adult so marked was 4-3/4 miles air line and across both the Willamette and Columbia Rivers, but in the direction of the prevailing wind. The longest span of life recorded by a stained specimen is 52 days and the fastest rate of travel noted was a half mile within 4 days.

Diking for control of sand fly and mosquito breeding.--At Fort Pierce, Fla., a diking experiment for control of sand fly and mosquito breeding in a mangrove marsh is most promising. The small rise and fall of the tides are not sufficient to permit drainage of such marshes. It is necessary to drain to a pit and then to remove the water from the pit by pumping. During the recent high tides there was no evidence of seepages and the dike was adequate for the protection of the marsh.

Benefits from C.W.A. mosquito control.--Gratifying reports concerning the effect of the mosquito control operations conducted in cooperation with the C.W.A. last winter in various parts of the country continue to come in. Thus, at Sandlake, Oreg., where a salt marsh area of 1,500 acres was drained by connecting numerous pot holes with the main channels, we are told that mosquitoes have been reduced from literally myriads to occasional specimens. A similar report is made concerning the effect of ditching on Bainbridge Island, Wash. At Savannah, Ga., the mosquito emergence was not sufficient to annoy residents during the past summer until about 2 months after the usual time for them to become annoying. The reduction was noticeable to all and some of the most skeptical have been convinced of the value of last winter's drainage operations.

Mosquito control in New Jersey, Delaware, and Maryland.--On September 25, F. C. Bishopp addressed the Rotary Club of Atlantic City, N.J., on the subject of mosquito control, after which some of the ditching operations in New Jersey, Delaware, and Maryland were inspected. Little progress in mosquito-control work in southern New Jersey is being made because of lack of funds. This is also true in Maryland, although in the vicinity of Ocean City there is an active interest in having the work continued. The work in Delaware, under the direction of W. E. Corkran, is being carried forward with vigor by the two C.C.C. camps assigned to that work last fall. A marked reduction in mosquito abundance has been manifest this season in the vicinity of Rehoboth, Lewes, and other coastal towns of southern Delaware, where this work is under way.

FOREIGN PARASITE INTRODUCTION

Pink bollworm parasites from Egypt.--Two shipments of *Microbracon kirkpatricki* Wilk. have recently been received from Cairo, Egypt. This species attains a high percentage of parasitization in Kenya and Tanganyka colonies and was introduced into Egypt a few years ago. Through the courtesy of the Egyptian entomologists, H. L. Parker was provided with sufficient stock for rearing purposes. Shipments were made of both adults and immature stages and these arrived at the bollworm laboratory at Presidio, Tex., in excellent condition.

Egg parasites of elm leaf beetle.--The shipment of *Galerucella* eggs from R. [illegible]. Burrell, of the Yokohama, Japan, laboratory, to H. S. Smith, Berkeley, Calif., forwarded in June, yielded a 16 percent emergence of *Tetrastichus* sp., with no hatch of unparasitized eggs. All eggs were kept in cool storage at approximately 50° F. for 2 to 4 weeks before shipment and were also held in cool storage en route. These conditions produced 100 percent mortality among unparasitized eggs, but were not detrimental to the immature stages of the parasite.

Importation of Tiphia sp. No. 29 for parasitization of Japanese beetle.--On September 10 there was received at the Moorestown, N.J., laboratory a shipment of 6,060 laboratory-reared cocoons of *Tiphia* sp. No. 29, which was examined by L. B. Parker. This material was reared by R. [illegible]. Burrell at the Yokohama laboratory from sericinid larvae parasitized by this *Tiphia*. Of a total of 11,167 ovipositions, 6,388 cocoons formed, representing 57 percent. Of these, 6,060, or 54 percent, were in good condition and were shipped to the United States on August 25. The cocoon formation is considered quite satisfactory, especially since the last 2,000 ovipositions were on host larvae that were in a very advanced state at the time of parasitization. Upon arrival at Moorestown, the shipment was broken down and the cocoons placed in the usual individual glass vial set-up for overwintering in the temperature-controlled cellars. Of the cocoons making up the shipment, 5,904, or 97.4 percent, appeared to be in excellent condition.

FOREIGN PLANT QUARANTINES

Recent entomological interceptions of interest.--Seven living larvae of the Mediterranean fruit fly were intercepted at San Francisco in a mango fruit in crew's quarters from Hawaii. An adult of *Ataenius picinus* Har. was intercepted at New York last April on packing for grapes in cargo from Argentina. Living specimens of *Galgupha punctifer* Mc. & M. were taken at Charleston, S.C., on banana debris in cargo from British Honduras and Honduras. Living specimens of *Rhodites rosae* L. were intercepted at Los Angeles, Calif., in galls on dead rose cuttings in the mail from Italy. The thrips *Frankliniella ameliae* Hood was found last May at Nogales, Ariz., on tomatoes in cargo from Mexico. J. R. Watson reports that this species is found in the Southwest, including Texas and New Mexico. Thirty larvae, 18 pupae, and 53 adults, all living, of the West Indian sweetpotato weevil (*Euscepes batatae* Waterh.) were intercepted last June at New Orleans in sweetpotatoes in stores from Brazil.

A living specimen of *Jadera rubrofusca* Barb. was collected on seagrape (*Coccoloba uvifera*) in the field at Dorado, P.R. A living adult of *Metriona propinqua* (Boh.) was taken at Mobile, Ala., on a banana in cargo from Honduras. *Lepidosaphes camelliae* Hoke was intercepted at San Francisco on *Camellia* sp. in ship's quarters from Japan. A living specimen of *Orthotylus ericetorum* Fall. was found at Philadelphia on a heather flower in the mail from England. The European corn borer was intercepted at Seattle, Wash., in ears of green corn in ship's stores from Japan. Both living and dead borers were found. A living mango weevil was found at San Pedro, Calif., in a mango seed in baggage from Hawaii. Larvae and pupae of the lesser bulb fly were intercepted at Washington, D.C., in a narcissus bulb in the mail from England. Living adults of *Hylesinus fraxini* Panz. were taken at Philadelphia in ash sapwood for crating chinaware in cargo from England.

Recent pathological interceptions of interest.--*Botrytis galanthina* (B. and Br.) Sudw. has been intercepted on *Galanthus* sp. bulbs an unusual number of times this fall. *Anguillulina dipsaci* (Kuhn) Gerv. and v. Ben. has been intercepted in *Chionodoxa* sp. from Holland at New York and Philadelphia, in *Muscari* sp. and *Scilla* sp. from Holland at New York, in *Hyacinthus* sp. from Holland at Detroit, and in garlic from Italy at Philadelphia. *Botrytis tulipae* (Lib.) E. F. Hopkins sclerotia were found on tulip bulbs from Holland at New York and Philadelphia. Sclerotia and conidia of *Penicillium gladioli* Machacek were found on gladiolus corms from Mexico at Nogales on September 8, our first interception of this disease from Mexico. *Phomatospora* sp. was found on leaves of *Euonymous* sp. from Japan at Seattle on August 30. The only previous interception of a member of this genus was on *Fatsia japonica* from Japan. Our first interception of *Septoria castaneae* Lev. was made at Philadelphia on August 27, on chestnut leaves from Italy. Our first interception of *Ramularia destructiva* Plowr. and Phil. was made at Baltimore on September 5, the host being *Myrica gale* from Scotland. A second interception of *Ustilaginoidea virens* (Cke.) Tak. in rice from the Philippine Islands (see Bureau Plant Quarantine News Letter, June 30, 1934, p. 3) has been made, this time at Philadelphia.

Fined for smuggling fruit.--A resident of Weslaco, Tex., was apprehended at Hidalgo as he attempted to smuggle 3 mangoes, 2 quinces, and 4 pomegranates from Mexico concealed under the seats of his automobile. A fine of $5 was assessed for the offense. Seven larvae, taken from one of the mangoes before the seized fruit was destroyed, have been identified at the National Museum as belonging to the genus *Anastrepha*.

Vegetable dye aids in identification of plant products.--Recently there arrived from abroad a shipment of dried plant material which was apparently unrecognizable. However, the idea of testing the fragments with alcohol occurred to someone. The solution was immediately colored by the diffusion of a soluble pigment, and the material readily gave up its identity. The pigment is a harmless vegetable dye, the product of a tropical plant long known and used for its easily extracted coloring properties, and has been frequently employed to impart a rich hue to wines.

Insect attacks packing cases.--Reversing the usual order of things, a shipment of 121 cases of cashew nuts from India entering New York on August 16, was found to have the wooden packing boxes badly infested by a wood-boring insect, although the nuts themselves were apparently not attacked. A similar shipment reached Philadelphia about the same time and the same insect was found in the wood of the cases. Some idea of the capacity of the insect for damage to wood is furnished by the report on the shipment held at New York, which states that "the infestation was so severe that the cases are rapidly disintegrating and piles of wood dust are accumulating in their vicinity." The insect, identified as Heterobostrychus aequalis Waterh., is not known to occur in the United States. It is said to be destructive on dead or fallen wood, and does not attack the living tree. Although it has been recorded only on Bombax malabaricum, the silk cotton tree, its distribution is noted from 20 localities in Asia, the Asiatic Islands, and Madagascar.

DOMESTIC PLANT QUARANTINES

Post offices affected by quarantine revisions.--Recent revisions in quarantine regulations relating to the gypsy moth and to the pink bollworm of cotton have changed the areas under regulation, and accordingly a list of post offices affected by the revisions has been compiled and is being distributed as "Memorandum to Users of Miscellaneous Publication No. 189, 'Synopsis of Federal Plant Quarantines Affecting Interstate Shipments.'" The memorandum, dated October 10, shows the changes required in the above publication. The original synopsis was issued in February 1934 as a pocket-size manual for use of inspectors, transportation agents, and nurserymen. The supply of the manual is exhausted.

Transit inspection.--Transit inspection was resumed in the early part of October at Kansas City, Omaha, Council Bluffs, St. Paul, Spokane, Portland, and Seattle. At Chicago another inspector has been added to the force, and at both Chicago and New York State inspectors are again assisting in the work. Shipping is reported as well up to normal as to such material as bulbs but unusually light as to nursery stock. A package containing a cotton plant with both open and closed bolls, a cactus, 5 clusters of 5-needle pine, an oak cutting, a bunch of dead Spanish moss, a dead grasshopper, and a live praying mantis, all packed in Spanish moss and coming from the area in Florida infested with the pink bollworm, was recently intercepted at Chicago. It was turned back as a violation of Quarantine No. 52.

Pine-shipping permits.--The inspection of zones surrounding nurseries growing five-leaved pines under rust-free conditions has now been completed, with the exception of one nursery in the West. Twenty-one permits to ship such pines from infected States during the present fiscal year have been issued thus far. The permittees include Forest Service nurseries at Parsons, W. Va., and Haugan, Mont., and State nurseries at Charlottesville, Va., and Marietta, Ohio. Tentative approval of seed beds planted in 1933 and 1934 was also given in the case of five other premises, of which two were Forest Service nurseries.

Phony peach eradication.--Beginning on September 4, 10 extra men were employed in Georgia at the rate of $4 per day to assist in inspection work. All were men who had been previously employed in phony peach eradication and who had demonstrated ability to diagnose the disease in the field. With this increased force, and operating under the new system by which the orchard owner furnishes labor for actually cutting down the phony trees, a remarkable number of trees were inspected and a very large number of phony trees removed, the latter being due to the fact that an almost complete inspection of commercial orchards in Macon County was made for the first time in 3 years. The percentage of infection is very high in this county, more phony trees having to be removed there than in any other county in the State or country. As a result of this acceleration in the work, most of the inspections planned in the heavily infected territory around Fort Valley have been completed, in addition to inspections in several other counties which otherwise would not have been reached this season. Although it will not be possible to complete all the work needed in the State of Georgia, much more has been accomplished than was anticipated a month ago. Growers furnish labor for the actual destruction of phony trees. During September all inspectors but one were engaged in commercial-orchard work. One man, assisted by a State inspector, worked in the environs of peach-growing nurseries in an attempt to clean up a 2-mile area around each. This work has been nearly completed.

Citrus canker eradication.--A recurrent infection of the citrus canker was found on two Texas premises during the month of September. In one case a grapefruit tree was involved; in the other orchard, the infected plants were 3 satsuma trees and 4 *Citrus trifoliata* sprouts from satsuma roots. Recurrent infections of citrus canker have been found in these orchards, and frequent and regular inspections are being made of properties where sporadic occurrences of the canker are found. So far the disease is being held in check and is not spreading to other satsuma trees in these two orchards. Steps are being taken to completely eradicate citrus canker from this area. Both premises are some distance from other growing citrus trees in Galveston and Brazoria Counties. In Louisiana 1 infected sweet orange tree was found in September in the town of Houma, in Terrebonne Parish, in the same locality where 2 infected trees were found last year. As a precautionary measure, a total of 9 trees were destroyed, 8 of which were not infected with the disease. There are no other citrus trees near the property on which the infected tree was found.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Dr. Böving returns from Europe.--A. G. Böving has just returned to Washington from a 2-month trip to Europe. Most of his time was spent in Denmark, which he visited on the invitation of the leading scientific workers of the country and where he delivered lectures on the classification of the immature stages of the Coleoptera and on economic entomology in the United States. During the trip he worked in the Royal Danish Museum at Copenhagen, examined the collections of coleopterous larvae in the British Museum in London, and studied immature Coleoptera at the University at Cambridge,

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England. Dr. Böving reports a marked increase in interest in the study of immature Coleoptera.

A cotton moth from the Florida mainland.--A single female of the moth *Anomis impasta* Guen., labeled, "Florida City, Fla., Dec. 3, 1933, collected by L. E. Forsythe", has been identified recently by F. H. Benjamin for A. G. Richards. Previously the species had been recorded as reared from wild cotton on Long Key, south of Florida City, these collections coming from C. F. Rainwater, of this Bureau. Mr. Benjamin finds that this species is closely related to the common cotton leaf worm (*Alabama argillacea* Hbn.) and that it so closely resembles the latter that it may have been confused with it previously.

New distribution for Tortilia viatrix Busck.--The African senna moth, first discovered in bales of senna stored in warehouses in Hoboken, N. J., has been identified recently by August Busck from material sent in from Chattanooga, Tenn., in senna bales supposedly coming from Hoboken.

A recently recognized rice-infesting moth.--Carl Heinrich has been able to place larvae, pupae, and adults of a pyralid of the subfamily Pyraustinae, found in rice straw chiefly at quarantine in Philadelphia, as *Susumia exigua* (Butl.). Undetermined specimens in the national collection from Java, Southern Siam, and the Philippine Islands were shown by studies of the genitalia to be the same species. Nobukatsu Marumo, of the Tokyo Imperial University, Tokyo, Japan, who supplied Mr. Heinrich with information respecting his genus *Susumia*, also stated that the moth which has gone under the name *Epimima nawae* Matsumura is identical with *Susumia exigua* (Butl.). The available information suggests that this species is of some importance as a rice pest.

Rediscovery of Microbracon psilocorsi Vier.--Among some specimens received for identification from H. S. McConnell, of the University of Maryland, C. F. W. Muesebeck has recognized 10 specimens of *Microbracon psilocorsi* Vier., reared at College Park, Md., from *Arogalea cristifasciella* Chamb. and *Psilocorsis obsoletella* Zell. This is the first record of the appearance of *M. psilocorsi* since the parasite was described in 1912 from specimens reared at Cuero, Tex.

Hexachaeta spp. found in the United States.--Specimens of fruit flies collected last spring in Texas from baited traps were recently sent in by N. O. Berry for verification of his tentative determinations. The specimens were checked with specimens and literature by F. H. Benjamin and apparently represent the first record of the occurrence of *Hexachaeta amabilis* Loew and *H. eximia* Wied. in this country. The first species was originally described from Mexico. The second was described from Dutch Guiana, but is reported from Brazil and Mexico. There seems to be no information on record respecting the host relationships or other biological facts for any species of the genus.

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